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A new species and new combinations in the corticioid genus *Gloiothele* (*Basidiomycota*)

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Abstract — A new corticioid fungus with smooth, globose, amyloid spores is described. *Gloiothele ventricosa* sp. nov. is characterized by its smooth hymenophore, ventricose gloeocystidia, globose to subglobose basidiospores with amyloid walls, and numerous hyphidia. The affinities to some other species in the genus and related genera are discussed and illustrations are given. Examination of the type specimen of *Gloiothele torrendii* suggests a placement in *Leptocorticium*, and the new combination *Leptocorticium torrendii* is proposed. *Gloeocystidiellum orientale* is resurrected and the new combination *Gloiothele orientalis* is proposed. A lectotype for *Flavophlebia sulfureoisabellina* is designated.

Key words — *Amylofungus, Gloiothele globosa,* lectotypification, taxonomy, *Vesiculomyces*

Introduction

The genus *Gloiothele* Bres. is composed of monomitic, clampless corticioid species with sulfopositive gloeocystidia and smooth, amyloid spores (Wu 1996b, Boidin et al. 1997). In a recent key by Hjortstam & Ryvarden (2005), the genus currently comprises 12 species. A closely related genus, *Vesiculomyces* E. Hagstr., is separated by the absence of sulfovanillin reaction in gloeocystidia (cf. Boidin & Lanquetin 1983, but also Larsson & Larsson 2003). Although *Vesiculomyces citrinus* (Pers.) E. Hagstr. 1977 shows a close relationship to some *Gloiothele* species in molecular studies, Larsson & Larsson (2003) and Miller et al. (2006) retain *Vesiculomyces* as distinct from *Gloiothele*. The creditability of sulfovanillin reaction as the mere character for distinguishing the two genera may be addressed with more comprehensive molecular tests.

Amylofungus Sheng H. Wu was originally described (Wu 1996a) to accommodate *Gloeocystidiellum corrosum* (G. Cunn.) Stalpers 1985 (≡

Vesiculomyces corrosus (G. Cunn.) Hjortstam 1995). The two species in the genus possess all diagnostic characters of *Gloiothele* with the added distinction of the amyloid reaction extending to the entire hymenophore. *Amylofungus* has not been included in a phylogenetic study to clarify its relationship to *Gloiothele* and *Vesiculomyces*.

Several *Gloiothele* species have globose-subglobose spores, among them being *Gloiothele globosa* Sheng H. Wu 1996 which was originally described on a single collection from Taiwan (Wu 1996b). Later, Boidin et al. (1997) reported this species from Réunion based on six specimens. During a study on these specimens and comparisons with the type of *G. globosa* and additional material, an undescribed *Gloiothele* species was uncovered that is described here (no. 14441, illustration also given by Boidin et al. 1997: 47). Moreover, several other corticioid species with gloeocystidia and globose spores came to the attention, and examination of their type specimens resulted in two new combinations and a lectotypification.

Materials and methods

Specimens were studied in 5% potassium hydroxide (KOH), Melzer's reagent (IKI) and Cotton Blue in lactic acid (CB) (see e.g. Largent et al. 1977). Sulfovanillin (SV) reagent (vanillin crystals in 80% sulphuric acid) was also used to examine the possible reaction of gloeocystidia (cf. Larsson & Larsson 2003). Measurements and drawings were made in CB using the light microscope. Line drawings were aided by a drawing tube. Spore measurements are based on at least thirty spores measured. The following abbreviations are used: L = length range, W = width range, Q = range of variation in L:W ratio. In each range, the values in the parentheses are 10 % of variation extremes.

Species description

Gloiothele ventricosa Ghobad-Nejhad **sp. nov.** Figs. 1–2.

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Basidiocarpum resupinatum, effusum, lignicolor, ceraceum, adnatum, 80–150(–200) µm crassum; superficies hymenialis plana. Systema hypharum monomiticum, efibulatum. Gloeocystidia numerosa, ventricosa, (15–)50–90(–115) × (7–)9–11(–15) µm, SV+. Hyphidiae numerosae. Basidiosporae globosae vel subglobosae, laeves, 5.9–7.1(–8.0) × (5.0–)5.3–6.7(–7.3) µm, amyloideae.

Holotype — Réunion: Notre Dame de la Paix I, on decorticated, fallen trunk "of angiosperm", 10 April 1990 legit Boidin 14441 (LY).

Etymology — the epithet *ventricosa* refers to the shape of gloeocystidia base.

Basidiocarp effuse, ceraceous, closely adnate, wood-colored, pale mouse-grey with a brownish tint, more or less soft in consistency, 80–150(–200) µm thick. Hymenophore smooth, irregularly and indistinctly tuberculate following the

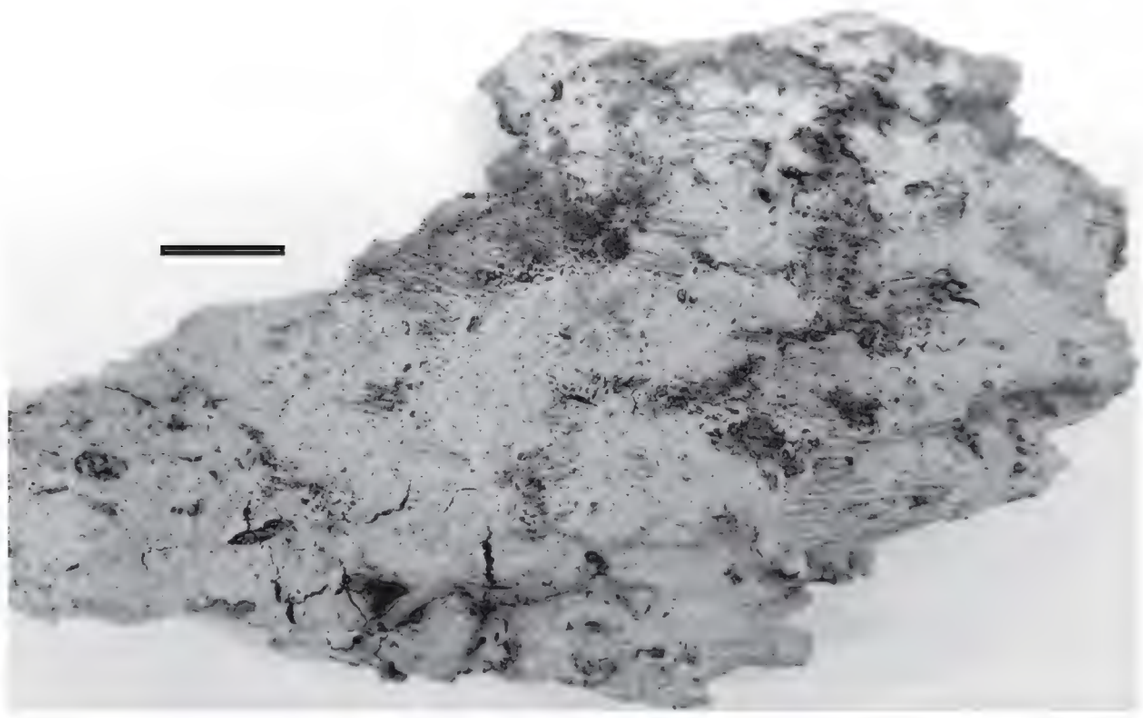

FIG. 1. Basidiocarp of *Gloiothele ventricosa* sp. nov. from holotype. Scale bar = 1 cm.

surface of the substrate, slightly cracked upon drying, pruinose under lens 16×. Margin thinning out, indistinct, concolorous with the hymenophore. HYPHAL SYSTEM monomitic, simple septate, pale yellowish to hyaline when examined in KOH, thin-walled, distinct (only little intricate and agglutinated in subhymenium), 1.7–2 µm in diameter, without oily exudate or crystal particles. Upper hymenial elements with slightly cyanophilous walls. Hyphae in lower subhymenium and subiculum more brownish than the rest of the hyphae. Subiculum indistinct. GLOEOCYSTIDIA numerous, embedded, L×W = (15–) 50–90(–115) × (7–)9–11(–15) µm, arising mostly from subiculum or subhymenium, extending up to the hymenium, not or only slightly projecting, ventricose at the base especially when young, less conspicuously so when mature, little flexuous, occasionally more or less cylindrical, attenuate at apex, contents pale yellowish brown, richly granulate to homogenous in KOH, contents shrunk when seen in IKI, weakly SV+ (light brown). Few hyaline, fusoid cystidia also present, projecting up to 30 µm above the hymenium. HYPHIDIA abundant, 1.7–2.5 µm wide, only slightly projecting, sparsely branched at apex. BASIDIA clavate to subcylindrical, slightly constricted in the middle, L×W = 33–46(–55) × (4.5–)5.5–7 µm, basally simple septate, with oily granules in their content, four-sterigmate, sterigmata 4–4.5 µm in length. BASIDIOSPORES globose to subglobose, L × W = 5.9–7.1(–8.0) × (5.0–)5.3–6.7(–7.3) µm, L_{mean} = 6.68 µm, W_{mean} = 5.96 µm, Q = 1.00–1.2(–1.27), Q_{mean} = 1.12, with a large, distinct, lateral apiculus, contents pale yellow from oil granules, with a large hyaline guttule when examined in CB, walls smooth, thin, CB– or weakly CB+, amyloid.

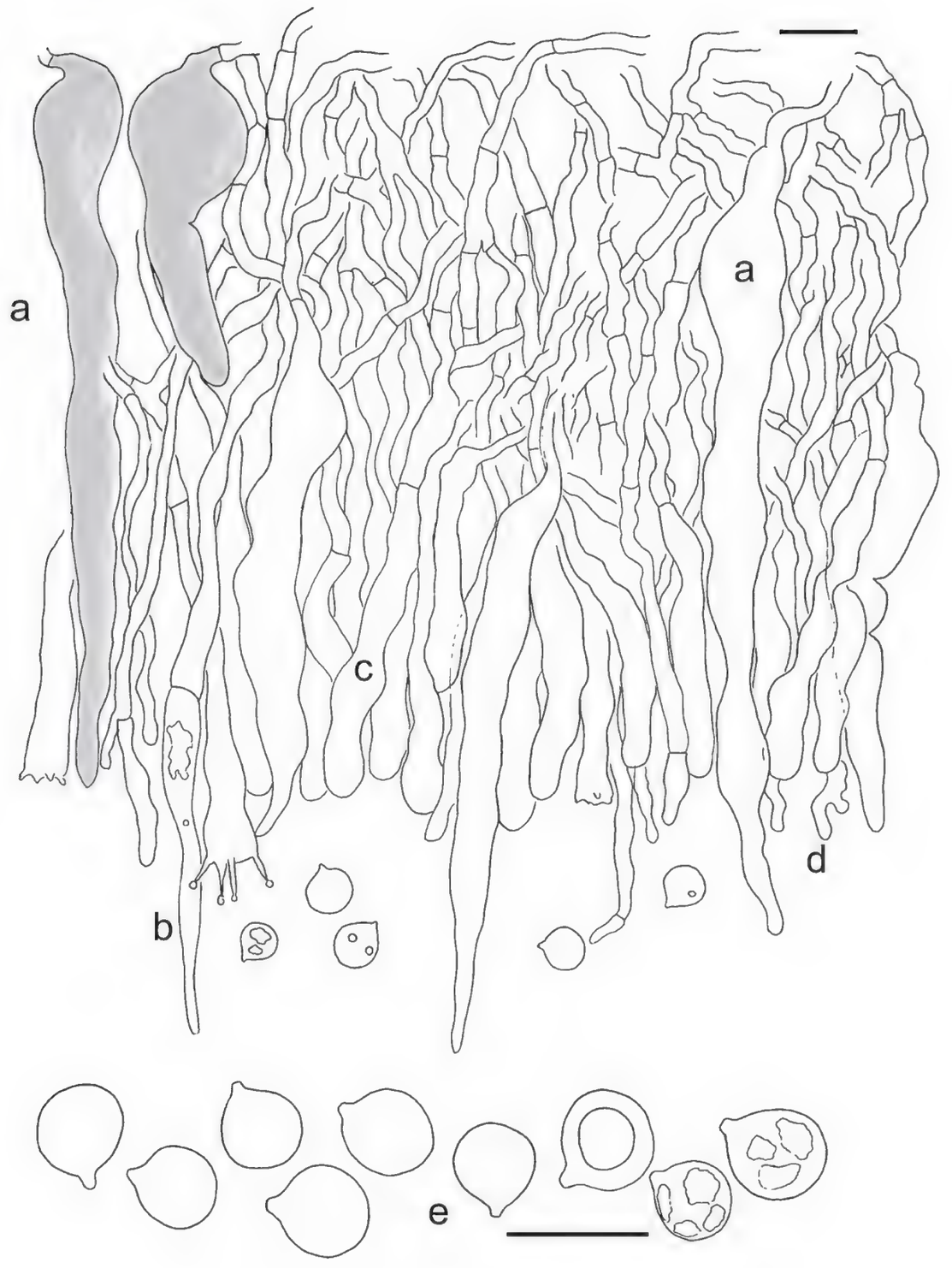

Fig. 2. A section of *Gloiothele ventricosa* drawn from holotype.
a) Gloeocystidia (two filled as exemplar), b) fusoid cystidia, c) basidia, d) hyphidia, e) spores.
Scale bar = 10 μm.

Additional specimens studied—*Gloiothele citrinoidea* (TYPUS). **Taiwan**. Taipei, Taipei Botanical Garden, on on sheath culm of *Phoenix dactylifera*, 27.VI.1992 Wu 9206–78 (TNM!).

Gloiothele globosa (TYPUS). **Taiwan**. Nantou, Chitou, alt. 1250 m, on branch of *Cryptomeria japonica*, 17.V.1991 Wu 910517–25 (TNM!).

Poria lamellosa Henn. 1904 (TYPUS). **Tanzania**. On trunk, 1899 Kummer 54, (S!).

Thelephora lactescens Berk. 1836 (TYPUS). **England**. Nottinghamshire, Clifton, on wood, 1836 Berkeley [British Fungi 1836–1843, no. 21] (K!).

Vesiculomyces citrinus. **Estonia**. Saaremaa, Odalätsi landscape protection area, on fallen log in mixed forest with *Pinus sylvestris*, 19.IX.2008 Ghobad-Nejhad 1756 (Ghobad-Nejhad ref. herb., dupl. in H).

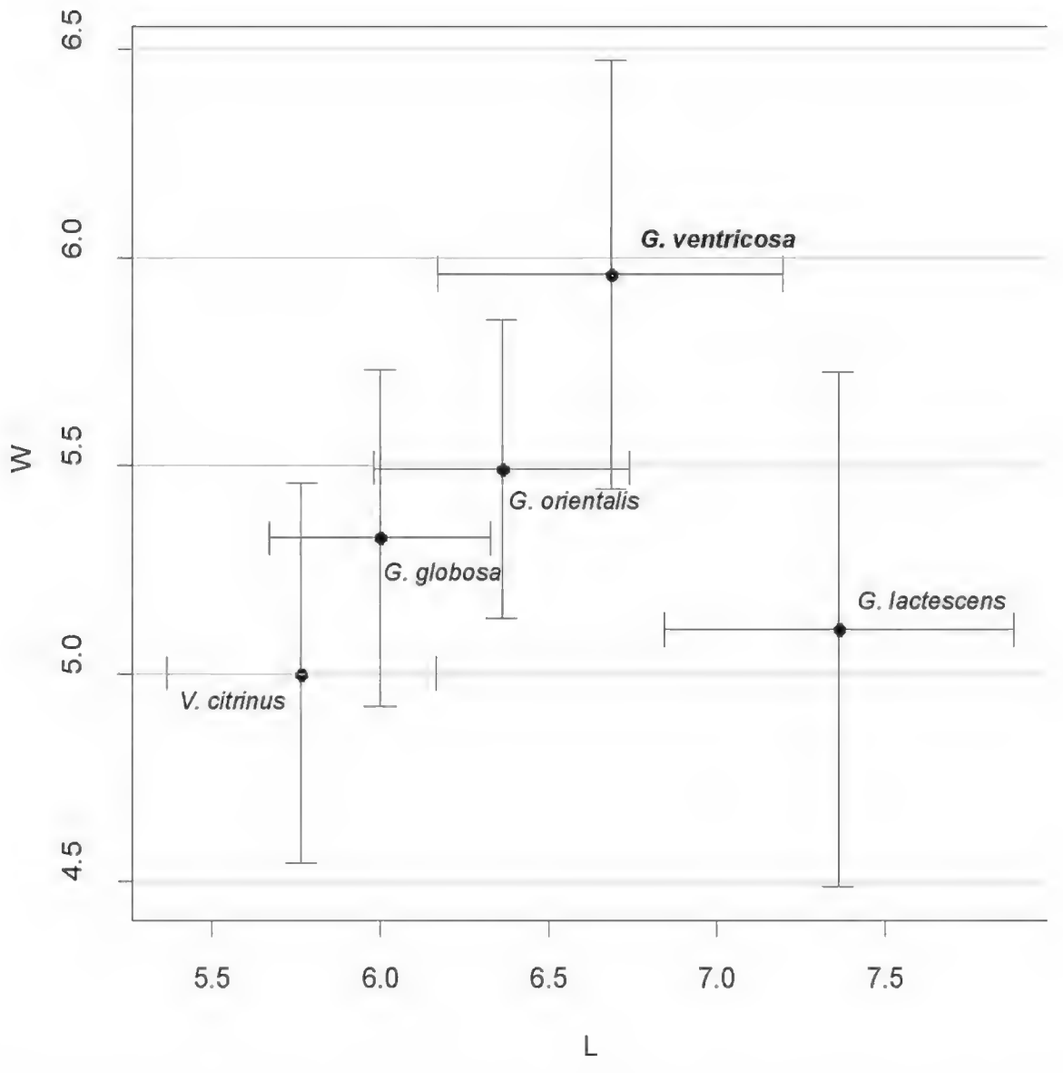

Fig. 3. Comparison of spore sizes (μm) in *Gloiothele ventricosa* with four closely related species. All measurements, except for *V. citrinus*, are from type material.

Comments: With regard to spore morphology, *G. ventricosa* is comparable to *Gloiothele* species with globose spores. *Gloiothele globosa* has smaller spores (Fig. 3) and differs also by its "yellowish white" hymenophore growing on corticated wood, fibrillose margins, and cylindrical gloeocystidia (see also

Wu 1996b). In *Gloiothele granulosa* Hjortstam & Spooner 1990, the hymenophore is granulose and spores are much smaller than in the new species (Hjortstam et al. 1990). Moreover, its gloeocystidia are widest in the middle, while they are most often broader at their lower part in *G. ventricosa*. *Gloiothele citrinoidea* Sheng H. Wu 1996 has short, clavate gloeocystidia arising from the hymenium (see also Wu 1996b).

The two species now accommodated in the genus *Amylofungus* have a spore shape very similar to *G. ventricosa,* but they differ primarily by their thoroughly amyloid hymenial elements. Moreover, *A. corrosus* (G. Cunn.) Sheng H. Wu 1996 has clavate gloeocystidia and smaller spores, and *A. globosporus* (N. Maek.) Sheng H. Wu 1997 has cylindrical gloeocystidia and its reported spore size is larger than in *G. ventricosa* (see Wu 1966a and 1997).

Vesiculomyces citrinus also possesses globose, amyloid spores and ventricose gloeocystidia. However, it already differs by having membranaceous hymenophore with citrinoid color, empty, hymenial cystidia (SV–), and smaller spores (Fig. 3).

As far as the abundant hyphidia and closely adnate hymenophore are concerned, *G. ventricosa* reminds of *Gloiothele lactescens* (Berk.) Hjortstam 1987. However the latter has ellipsoid spores (Fig. 3) and very long, cylindrical gloeocystidia. In addition, the hymenophore in *G. lactescens* is hard, usually cracking characteristically when aged (Eriksson & Ryvarden 1975).

Globose spores have also been mentioned for *Gloiothele torrendii* (Bres.) Boidin & H. Michel 1997. Examination of the holotype of *Corticium torrendii* (Fig. 4) shows that it is quite different from *Gloiothele* species. The specimen has a fragile, pruinose fruitbody (cracked in small polygons), richly branched hyphae with frequent clamps, urniform basidia, numerous crystallized dendrohyphidia, and hymenial gloeocystidia devoid of oil granules. Spores lack oily contents and do not react with IKI. These characters can potentially indicate a placement in *Leptocorticium* Hjortstam & Ryvarden, and the new combination is proposed below (see Nakasone 2005 for genus emendation).

Leptocorticium torrendii (Bres.) Ghobad-Nejhad **comb. nov.** Fig. 4

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Basionym—*Corticium torrendii* Bres., Atti Acad. Agiato Rovereto 8(2): 131 (1902).

Holotype—**Portugal.** Setúbal, on branch of *Olea europaea,* no date, Torrend s.n. (S, F14595!).

The specimen studied here has Bresadola's handwritten description that is identical to the protologue. No reference to a type material could be found in the publication by Boidin & Michel (1997).

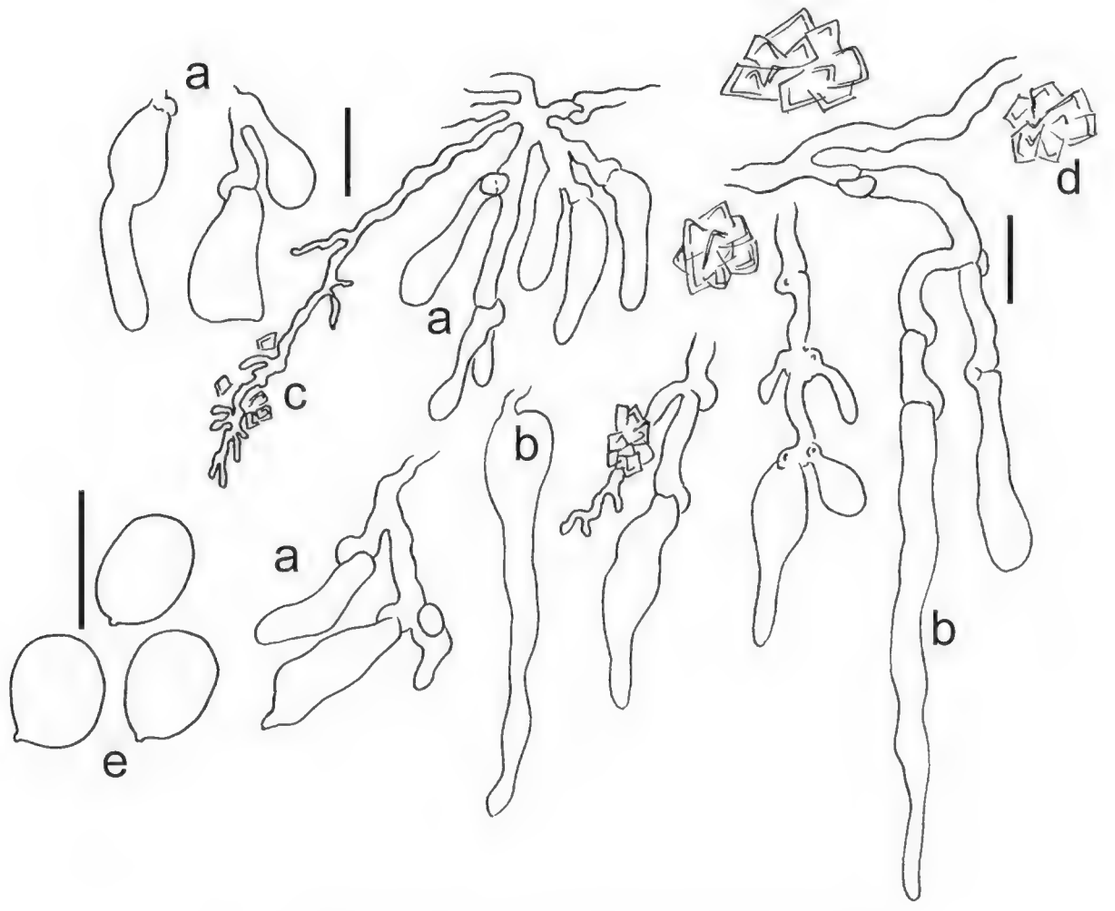

Fig. 4. A section of *Corticium torrendii* drawn from holotype.
a) Basidia in different stages of development, b) gloeocystidia, c) dendrohyphidia, d) crystals, e) spores. Scale bar = 10 μm.

Very similar spore morphology is also assumed in *Gloeocystidiellum orientale*, a little known species with amyloid, globose spores, described by Parmasto (1965) from a single specimen collected by him in Russian Far East. Eriksson & Ryvarden (1975) raised the question whether this species is only a young form of *Gloeocystidiellum lactescens* (Berk.) Boidin 1951, and later Wu (1996b: 6) pointed out its possible affinity to the genus *Gloiothele*. An examination of the isotype of *G. orientale* at GB confirms that it is a species of *Gloiothele*. It has sulfovanillin positive gloeocystidia (they are brown, with a bluish tint), and is distinct from *G. lactescens* by its much thinner, detachable basidiocarp, as well as developing fewer and shorter gloeocystidia (also stated in protologue). Therefore the following new combination is proposed.

Gloiothele orientalis (Parmasto) Ghobad-Nejhad **comb. nov.** Fig. 5

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Basionym—*Gloeocystidiellum orientale* Parmasto, Eesti N.S.V. Tead. Akad. Toimet., Biol. 14(2): 225 (1965).

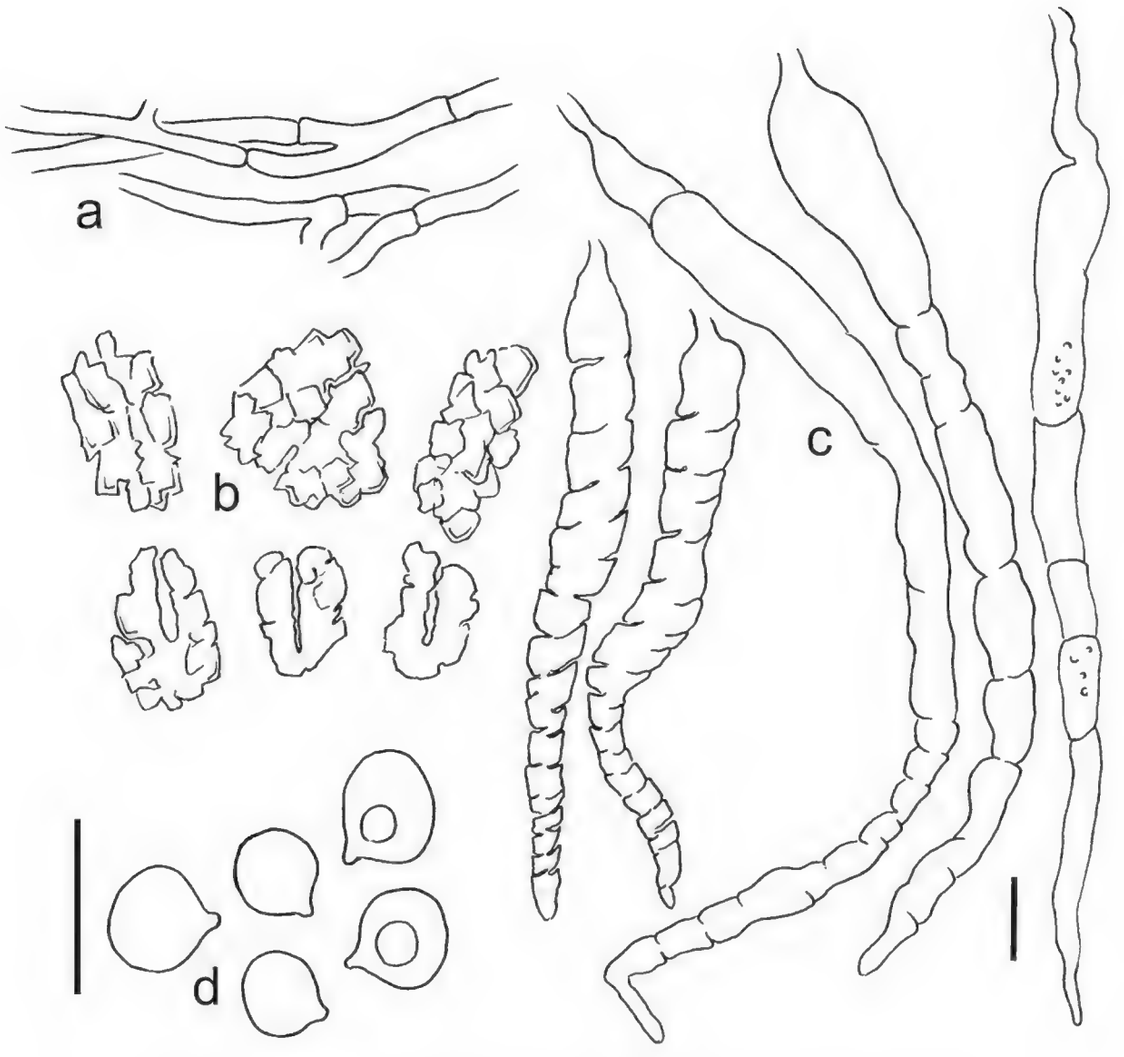

Fig. 5. A section of *Gloeocystidiellum orientale* drawn from holotype.
a) Hyphae, b) crystal aggregations, c) cystidia with highly shrunk contents, d) spores.
Scale bar = 10 μm.

Holotype—**Russia.** Regio Primorsk: Reservatum Suputinka, on *Maackia amurensis,* 1961 Parmasto 14673 (GB, isotype!).

The studied specimen bears hyphal ends with loose encrustations (Fig. 5), which easily can be overlooked if the section is firmly squashed. These structures are present in the generitype, *Gloiothele lamellosa* (Henn.) Bres. 1920, but are smaller and formed only in upper hymenium on dissepiment edges, while in *G. orientalis* they are larger, and embedded. Gloeocystidial contents are pale yellow in KOH and contracting in CB mounts. Fruitbody structures are generally acyanophilous (CB–). *Gloiothele humilis* (Boidin) Boidin, et al. 1997 apparently has a hymenophore similar to *G. orientalis* (Boidin 1966, Boidin et al. 1997), and has encrusted hyphal ends and brown sulfovanillin reaction of gloeocystidia (Hjortstam & Ryvarden 2005). However, no material of this species was available for close comparison in the present study.

Lectotypification

Flavophlebia sulfureoisabellina (Litsch.) K.H. Larss. & Hjortstam (1977)

Flavophlebia (Parmasto) K.H. Larss. & Hjortstam is a monotypic genus erected by Hjortstam & Larsson (1977) for *Corticium sulfureoisabellinum* Litsch (Pilát 1940). Dämon (1998) provided detailed notes on its history of taxonomy, ecology, and general distribution.

Specimens studied—*Corticium sulfureoisabellinum* (TYPUS). **Czech Republic.** Ivan, Bilý Potok, Strunžín near Trebušany, on decayed trunk of *Abies alba*, VIII.1935 Pilát 19741 (PRM! **lectotype designated here**). **Russia.** Krasnodar: Caucasus Nature Reserve, Umpyr, alt. 1500 m, on *Abies nordmanniana,* 12.IX.1991 Kõljalg (159011 TAA). **Poland.** Sucha Beskidzka, Babia Gora National Park, on *Abies*, 15.IX.1973 Hallenberg & Larsson (2645 GB).

In the original description of *C. sulfureoisabellinum* (Pilát 1940: 43), five specimens were mentioned from the same locality viz. nos. 19471, 19472, 20141, 20442, and 20428, deposited in Herbarium Musei Nationalis Pragae (PRM), but no holotype was designated. In his detailed description of the species, Jackson (1948) mentioned a studied type in TRT, without a number. None of the studies on the species made afterwards (summarized by Dämon 1998) concerned the type examination. In order to prevent probable confusion and facilitate further communications concerning this species, PRM specimen no. 19741 is designated here as lectotype.

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